

liquid flow to said coating head from a coating liquid supply path extending to said coating head

REMARKS

In the outstanding Office Action, the Examiner required that Applicants elect for prosecution one of the inventions of:

Group I (Claims 1-2 and 4), drawn to a coating method and a method of manufacturing a color filter using the coating method, classified in class 427, subclass 424;

Group II (Claim 3), drawn to a coating apparatus, classified in Class 118, subclass 300; OR and

Group III (Class 5), drawn to a liquid crystal display device, classified in class 349, subclass 106 are withdrawn from prosecution.

Applicants previously elected provisionally to prosecute the subject matter of Group I. By the above cancellation of claims 3 and 5, that provisional election is hereby affirmed.

The Examiner has objected to the drawings (paragraphs 8 and 9 of the Office Action), to the title of the invention (paragraphs 10 and 11 of the Office Action), to the abstract of the disclosure (paragraph 12 of the Office Action) and to the specification (paragraphs 13-15 of the Office Action). By the above amendments, these objections are all mooted. Accordingly, withdrawal thereof is earnestly solicited.

Claims 1, 2 and 4 are rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention. Although Applicants respectfully wish to point out that claim 1 is an original claim and this provides its own

enabling disclosure, such claim has nevertheless been amended in conformity with the Examiner's kind suggestions. Accordingly, this rejection is overcome.

Claims 1 and 2 are rejected as being anticipated by Asahi Glass Co. Ltd. (JP 10282329 A), Maneke et al. (U.S. Patent No. 4,704,308), Henninger (U.S. Patent No. 4,560,584), and Poag et al. (U.S. Patent No. 5,958,517). Additionally, Claim 4 is rejected as obvious over applicant's admitted prior art in view of Asahi Glass Co. Ltd. in view of Poag. This rejection is respectfully traversed in view of the following remarks.

As recited in claim 1, the present invention distinguishes Asahi in that Asahi does not teach an ink jet head not for coating process (like the present invention), but for pattern forming and does not teach rinsing the inside of the coating head (like the present invention), but rinsing an end section of the ink jet, e.g., the portion which is exposed to atmosphere.

Maneke also relates to maintenance issues during extended interruption, while the present invention relates to cleaning in a cleaning in a continuous operation. (Similarly, Heninger also deals with maintenance issues during long term interruption of service.)


Finally, Poag is directed to a spinner and does not teach a nozzle for direct coating like the present invention, but for dispensing coating liquid on a substrate surface. That is, in Poag, the coating is performed by spinning operation.

In view of the above amendments and remarks, Applicants submit that all of the Examiner's concerns are now overcome and the claims are now in allowable condition. Accordingly, reconsideration and allowance of this application is earnestly solicited.

Claims 1, 2 and 4 remain presented for continued prosecution.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,


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Application No. 09/471,160
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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Amended) A coating method of ejecting a coating liquid over the surface of a member to be coated and thus forming a coated layer thereon by relatively moving a coating head and said member to be coated, comprising:

a step of rinsing said coating head by stopping a supply of the coating liquid to said coating head after ejecting the coating liquid, and making a rinsing liquid flow [directly] to said coating head [or toward said coating head] from [midway of] a coating liquid supply path extending to said coating head.

3. (Canceled).

5. (Canceled).

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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO SPECIFICATION

The Title at page 1 has been amended as follows:

SLIT COATING METHOD[, COATING DEVICE,] AND METHOD OF MANUFACTURING COLOR FILTER SUBSTRATE USING THE SAME [COATING METHOD, AND LIQUID CRYSTAL DISPLAY DEVICE USING THE COLOR FILTER SUBSTRATE MANUFACTURED BY THE SAME MANUFACTURING METHOD]

The paragraph at page 4, lines 6-24 have been amended as follows:

In the prior art coating device (slit coater) shown in FIG. 4, it is [inevitable] difficult to prevent the coating liquid from being solidified at the tip of the coating head 5. Hence, according to the prior art, if a stop time elongates, a rinsing liquid (such as a solvent of the coating liquid) is flowed from a liquid supply circuit. Areas where the rinsing is actually needed are mainly the tip area of the coating head 5 and a slit area 54, so that it must be more of waste of the coating liquid to fill all the coating circuits with the rinsing liquid and to be again replaced with the coating liquid when returned. In addition, it takes much time to perform the rinsing process and the return process of replacing again the rinsing liquid with the coating liquid. Referring to FIG. 4, there are shown a coated layer 6, a member to be coated 7, a carrier stage 8, a coating liquid tank 11, a pipe 12, an opening/closing valve 13, a filter 14, and a quantitative pump 15.

The paragraph at page 14, lines 13-19 have been amended as follows:

(e) The heat drying treatment (the post-baking) is executed in order to main-
cure the photosensitive resinous composition in [the] black [matrix] to form the black
matrix. At this time, the main curing of the ink is also preferably carried out. Thereafter, if

necessary, the protection film is formed using the application system of the present invention.

The paragraph starting at page 14, lines 24 and ending at page 15, line 24 has been amended as follows:

The color liquid crystal panel is typically constructed by matching the color filter substrate 1 with a face-to-face substrate 64 and sealing a liquid crystal composition 62 therebetween. TFTs (not shown) and transparent pixel electrodes 63 are formed in matrix inwardly of one substrate 64 of the liquid crystal panel. Further, a color filter substrate 69 is provided inwardly of the other substrate 1 so that RGB color materials are arranged in positions facing to the pixel electrodes. A transparent face-to-face electrode (common electrode) 60 is provided on one surface of the color filter substrate 69. The black matrix is normally formed on the side of the color filter substrate. Moreover, an orientation layer 61 is formed within the plane between the two substrates and subjected to a rubbing process, whereby liquid crystal molecules can be arrayed in a fixed direction. Further, a polarizing plate 65 is bonded to an external portion of each glass substrate, and a liquid crystal compound 62 fills in a gap (on the order of 2- 5 μm) between those glass substrates. Moreover, a combination of a fluorescent lamp (not shown) and a scattering plate (not shown) is generally used as a back light, and the liquid crystal compound functions as an optical shutter for varying a transmissivity of a beam 66 of the back light, thus performing the display. A protection layer designated by 36 may be provided according to the necessity.

The Abstract of the Invention section at page 29 has been amended as follows:

ABSTRACT OF THE DISCLOSURE

In a method for coating a member with a coating liquid [during moving] while relatively moving a coating head and the member to be coated, the head often ejecting the coating liquid over a surface of the member, a supply of coating liquid to the coating head is stopped. And, then the coating head is rinsed. The rinsing liquid flows directly to or toward the coating head, from midway of a coating liquid supply path extending to the coating head, thereby improving an efficiency of cleaning and maintenance of the coating head.

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mailing of the April 2, 2001, Office Action. Therefore, the Patent and Trademark Office is requested promptly to indicate to the undersigned when the Amendment filed on October 2, 2001, will be acted upon. In the event such a paper cannot be located by the Patent Office, attached hereto is a courtesy copy of the Petition for Extension of Time and Amendment.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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